REMARKS

This is a full and timely response to the non-final Office Action mailed June 23, 2005. Reconsideration and allowance of the application and presently pending claims are respectfully requested.

1.Present Status of the Application

Upon entry of the amendments in this response, claims 92-160 remain pending in the present application. More specifically, claims 1-91 are directly canceled and claims 92-160 are newly added. It is believed that the foregoing amendments add no new matter to the present application.

2.Response To Objections/Rejections

Response To Claim 92

As currently amended, independent claim 92 recites below:

92. A bonding structure, suited for bonding a first electric component and a second electric component, comprising:

a pillar over said first electric component; and

a cap over said pillar, wherein said cap has a greatest transverse dimension less than a transverse dimension of said pillar, said cap suited for being bonded to a pad exposed by an opening in an insulation layer of said second electric component, wherein said greatest transverse dimension of said cap is less than a transverse dimension of said opening, wherein said cap is formed over said pillar before said first electric component is bonded to said second electric component.

Applicant respectfully asserts that the method claimed in claim 92 of the present invention patentably distinguishes over Ogura's structure (US6,706,554) and Burnette's structure (US6,552,436).

Ogura teaches a bonding structure comprising a pillar 22 and a cap 26, wherein the cap 26 is over the pillar 22 and has a greatest transverse dimension less than a transverse dimension of the pillar 22. ~ *See FIG. 1H* ~ However, *Ogura fails to teach the cap 26 can be bonded to a pad exposed by an opening in an insulation layer of an electric component. Ogura fails to teach, hint or suggest the relationship between the cap 26 and the opening in the insulation layer of the electric component.*

Burnette teaches a bonding structure 44 capable of being bonded to a pad 40 exposed by an opening in an insulation layer 38 of an electric component 42. ~ *See FIG. 2* ~ *However, Burnette fails to teach the bonding structure 44 comprises a pillar and a cap, wherein the cap is over the pillar and has a greatest transverse dimension less than a transverse dimension of the pillar. Burnette fails to teach a cap over a pillar may have a greatest transverse dimension less than a transverse dimension of an opening in an insulation layer.*

Applicants consider that the claimed structure can not be attained by the combination of Ogura's and Burnette's structures because the bonding structures by Ogura and Burnette are significantly different. One has a pillar and a cap; the other one has no pillar and no cap. Even though Ogura's and Burnette's structures are combined, the claimed feature that *"a cap over a pillar may have a greatest transverse dimension less than a transverse dimension of an opening in an insulation layer"* can not be attained.

For at least the foregoing reasons, applicants respectfully submits that independent claim 92 patently define over the prior art references, and should be allowed. For at least the same reasons, dependent claims 93-117 patently define over the prior art as well.

Response To Claim 118

As currently amended, independent claim 118 recites below:

118. A bonding structure, comprising:
a pillar comprising copper and formed using a process comprising electroplating; and
a cap comprising tin and over said pillar, wherein said cap has a greatest transverse dimension less than a transverse dimension of said pillar and has a height less than a height of said pillar.

Applicant respectfully asserts that the method claimed in claim 118 of the present invention patentably distinguishes over Ogura's structure (US6,706,554).

Ogura teaches a bonding structure comprising a pillar 22 and a cap 26, wherein the cap 26 is over the pillar 22 and has a greatest transverse dimension less than a transverse dimension of the pillar 22. ~ *See FIG. 1H* ~ However, *Ogura fails to teach, hint or suggest that the pillar 22 may comprise copper and may be formed using a process comprising electroplating*, which is claimed in claim 118. Moreover, *Ogura fails to teach, hint or suggest that the cap 26 may comprise tin*, which is claimed in claim 118.

For at least the foregoing reasons, applicants respectfully submits that independent claim 118 patently define over the prior art references, and should be allowed. For at least the same reasons, dependent claims 119-127 patently define over the prior art as well.

Response To Claim 128

As currently amended, independent claim 128 recites below:

128. A bonding structure, comprising:
a pillar comprising gold; and
a cap comprising tin and over said pillar, wherein said cap has a greatest transverse dimension less than a transverse dimension of said pillar.

Applicant respectfully asserts that the method claimed in claim 128 of the present invention patentably distinguishes over Ogura's structure (US6,706,554).

Ogura teaches a bonding structure comprising a pillar 22 and a cap 26, wherein the cap 26 is over the pillar 22 and has a greatest transverse dimension less than a transverse dimension of the pillar 22. ~ *See FIG. 1H* ~ However, *Ogura fails to teach, hint or suggest that the cap 26 may comprise tin*, which is claimed in claim 128.

For at least the foregoing reasons, applicants respectfully submits that independent claim 128 patently define over the prior art references, and should be allowed. For at least the same reasons, dependent claims 129-137 patently define over the prior art as well.

Response To Claim 138

As currently amended, independent claim 138 recites below:

138. A bonding structure, comprising:
a pillar comprising a tin-lead alloy; and
a cap over said pillar, wherein said cap has a greatest transverse dimension less than a transverse dimension of said pillar.

Applicant respectfully asserts that the method claimed in claim 138 of the present invention patentably distinguishes over Ogura's structure (US6,706,554).

Ogura teaches a bonding structure comprising a pillar 22 and a cap 26, wherein the cap 26 is over the pillar 22 and has a greatest transverse dimension less than a transverse dimension of the pillar 22. ~ *See FIG. 1H* ~ However, *Ogura fails to teach, hint or suggest that the pillar 22 may comprise a tin-lead alloy*, which is claimed in claim 138.

For at least the foregoing reasons, applicants respectfully submits that independent claim 138 patently define over the prior art references, and should be allowed. For at least the same reasons, dependent claims 139-148 patently define over the prior art as well.

Response To Claim 149

As currently amended, independent claim 149 recites below:

149. A bonding structure, comprising:
a pillar comprising a tin-silver-copper alloy; and
a cap over said pillar.

Applicant respectfully asserts that the method claimed in claim 149 of the present invention patentably distinguishes over Ogura's structure (US6,706,554).

Ogura teaches a bonding structure comprising a pillar 22 and a cap 26, wherein the cap 26 is over the pillar 22 and has a greatest transverse dimension less than a transverse dimension of the pillar 22. ~ *See FIG. 1H* ~ However, *Ogura fails to teach, hint or suggest that the pillar 22 may comprise a tin-silver-copper alloy*, which is claimed in claim 149.

For at least the foregoing reasons, applicants respectfully submits that independent claim 149 patently define over the prior art references, and should be allowed. For at least the same reasons, dependent claims 150-160 patently define over the prior art as well.

CONCLUSION

For at least the foregoing reasons, it is believed that the pending claims 92-160 are in proper condition for allowance. If the Examiner believes that a telephone conference would expedite the examination of the above-identified patent application, the Examiner is invited to call the undersigned.

Respectfully submitted,
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